Original Article

Patients Have Poor Postoperative Recall of Information Provided the Day of Surgery but Report Satisfaction With and High Use of an E-mailed Postoperative Digital Media Package

Kyle Shultz, D.O., Marissa Mastrocola, M.D., Tyler Smith, D.O., and Brian Busconi, M.D.

Purpose: To understand what portions of the surgical day patients remember, what parts of an e-mailed media package regarding their surgery patients are used, and how that information affects their surgical experience. **Methods:** Patients undergoing an outpatient arthroscopic procedure were approached in the preoperative area and asked to remember 3 words. Postoperatively, they were seen by the surgeon to discuss surgical findings and instructions. They were then e-mailed a multimedia package containing a thank you letter, postoperative instructions, annotated arthroscopy images, and a personalized video from the surgeon. Patients were called 2 to 5 days after surgery to answer survey questions and recall the 3 words they were told on the day of surgery. **Results:** Of the 160 patients, 100% received and accessed the e-mail. When asked if they remembered the postoperative conversation, 125 (78.1%) patients responded yes and 35 (21.9%) responded no. When asked to rate how well they remembered the postoperative conversation, 75.2% patients rated their memory very poor (48, 38.4%) or poor (46, 36.8%). Similarly, 129 (80.6%) patients were unable to remember the 3 surgeon-related words. One hundred percent of patients strongly agreed (145, 90.6%) or agreed (15, 9.4%) the e-mail package enhanced their experience. In addition, 100% of patients strongly agreed (150, 93.8%) or agreed (10, 6.2%) the surgeon video enhanced their experience. The average e-mail shares per patient was 2.5, with 158 (98.7%) of patients sharing the e-mail at least once. **Conclusions:** This study shows that patients had poor memory of in-person conversations on the day of surgery. However, patients were satisfied with a postoperative multimedia package provided via e-mail after surgery. Patients interacted with the e-mail primarily on their cell phones, liked the surgeon video, and shared the e-mail with others. **Level of evidence:** Level IV, therapeutic case series.

Patient satisfaction remains a fundamental concern within orthopaedic surgery.[1] Improved patient satisfaction has been tied to multiple measures, including better outcomes, reduced readmission rates, adherence to treatment plans, and improved follow-up.[2-5] Many factors impact the subjective patient experience.[2,6] Although many of these are related to the successful technical portion of the procedure, a large portion also are related to physician communication and engagement throughout the perioperative period. For outpatient surgical procedures, it has been found that the most influential factors involving patient satisfaction are informed consent and home care after discharge.[7]

Patient recall and retention of medical information in the recovery area is poor following the administration of anesthesia.[8] Frequently used methods of postoperative engagement include discussion with family members, telephone encounters, and printed postoperative instructions. Family interpretation of information may vary, and telephone encounters may be time-consuming for the surgeon and office staff. In addition, several studies have demonstrated that postoperative instructions may be confusing, difficult to

From the Orthopedic and Sports Medicine Center, Elkhart, Indiana (K.S.); University of Massachusetts, Worcester, Massachusetts (M.M., B.B.); and St. Luke's University Health Network, Bethlehem, Pennsylvania (T.S.), U.S.A.

The authors report the following potential conflicts of interest or sources of funding: B.B. reports personal fees from Arthrex, personal fees and royalties from DePuy Synthes Sports Medicine, and personal fees from ConMed, outside the submitted work. Full ICMJE author disclosure forms are available for this article online, as supplementary material.

Received February 28, 2023; accepted June 3, 2023.

Address correspondence to Marissa Mastrocola, M.D., 55 Lake Ave N., Worcester, MA 01604. E-mail: marissamastrocola@gmail.com

2666-061X/23302

https://doi.org/10.1016/j.asmr.2023.100757

Table 1. Study Population by Age Group and Sex

Age Group, y	Male	Female	Total
18-29	37	23	60
30-39	8	10	18
40-49	17	16	33
50-59	24	17	41
60-69	1	7	8
70+	0	0	0
Total	87	73	160

understand, and are often lost or misplaced.[9-11] Santoro et al.[2] demonstrated improved patient surgical experience and understanding of the surgical procedure when patients were sent an e-mail containing digital instructions and annotated surgical images compared with the standard printed instructions. The addition of digital media (i.e., video calls, recorded video message, pictures) has been shown to improve patient satisfaction and engagement.[2,12-14] Evolving technology continues to provide opportunities to improve the patient experience; however, to fully use them, we must understand what information patients find beneficial and how they use it.

The purpose of this study was to understand what portions of the surgical day patients remember, what parts of an e-mailed media package regarding their surgery patients used, and how that information affected their surgical experience. We hypothesized that patients would have poor recall of postoperative instructions and would appreciate the digital multimedia package e-mailed to them after surgery.

Methods

This project was reviewed by the University of Massachusetts Institutional Review Board and deemed that the project was not research involving human subjects as defined by the U.S. Department of Health and Human Services and Food and Drug Administration regulations.

This is a prospective, single-surgeon study evaluating patient satisfaction with a postoperative e-mailed media package and their perioperative information recall. Two-hundred patients were consented on the day of surgery for participation in the study. The preoperative conversation included consent for study participation in addition to expected and possible surgical findings, risks and benefits, site of surgery confirmed and marked by the patient, and expected postoperative instructions. Inclusion criteria were as follows: adult patients 18 years or older with access to a working and functional e-mail address who underwent an outpatient arthroscopic procedure of the shoulder, hip, or knee. Patients were English-speaking and consented to answer questions via telephone encounter 2 to 5 days after surgery. Exclusion criteria involved not meeting the aforementioned metrics. Pediatric patients younger than 18 years of age were excluded due to the possibility of bias between the patient and parent/guardian. All procedures and patient interactions related to the study were performed by a single, fellowship-trained sports medicine surgeon.

Postoperatively, all patients were seen by the surgeon between 30 and 60 minutes of arrival in the post-anesthesia care unit. Intraoperative findings, details of the procedure, and postoperative recommendations were discussed with the patient. No visual media were used in the postoperative interaction. Patients were told 3 words related to the surgeon to remember for their later telephone encounter. These 3 words were Gulliver, hockey, and the number 12. They were also reminded they would be receiving an e-mail on the same day of surgery containing a thank you letter, postoperative written instructions, annotated arthroscopy images, and a personalized video from the surgeon reviewing the procedure and postoperative instructions. The media package was prepared using the Synergy Surgeon Vault cloud-based surgeon-patient communication software tool (Arthrex, Naples, FL). Patients were then called 2 to 5 days after surgery by ambulatory surgery center study staff, and the survey questions were asked over the phone. No patients received financial benefits for completing the survey.

Data were deidentified and compiled in a Microsoft Excel (Redmond, WA) file. Data counts and averages were calculated for each question.

Results

One hundred seventy patients were enrolled in the study. Ten patients who provided consented on the day of surgery were unreachable by phone or declined to answer questions at their follow-up call. The final study population was 160 patients, 87 male and 73 female, with count by decade seen in Table 1.

One hundred sixty patients (100%) responded that they successfully received and accessed the e-mail.

Table 2. Yes and No Respondent Questions

Question	Yes (N, %)	No (N, %)
Did you receive the email?	160 (100)	0 (0)
Do you remember the pre-operative conversation?	160 (100)	0 (0)
Do you remember the post-operative conversation?	125 (78.1)	35 (21.9)
Can you remember the three key words?	31 (19.4)	129 (80.6)
Was the e-mail easy to understand?	160 (100)	0 (0)
Were the lables on the images easy to understand?	160 (100)	0 (0)
Were the post-operative instructions easy to understand?	160 (100)	0 (0)
Did you feel the need to call the office?	18 (11.2)	142 (88.8)

NOTE. Data are listed as number of patients per response (N) and percentage of total respondents (%).

Table 3. Categorical Responses to Questions

Question	Very Poor	Poor	Fair	Good	Excellent
How well do you remember the postoperative conversation?*	48 (38.4)	46 (36.8)	2 (1.6)	29 (23.2)	0 (0)
How were the quality of the images?	0 (0)	0 (0)	0 (0)	0 (0)	160 (100)
	Cell Phone	Desktop	Laptop	Tablet	Multiple Devices
How did you access your e-mail?	126 (78.8)	24 (15.0)	0 (0)	0 (0)	10 (6.3)
	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Did the email package enhance your post operative experience?	0 (0)	0 (0)	0 (0)	15 (9.4)	145 (90.6)
Did the video enhance your postoperative experience?	0 (0)	0 (0)	0 (0)	10 (6.2)	150 (93.8)
	Not Recommend	Recommend	Highly Recommend		
How likely are you to recommend this format to a friend undergoing surgery?	0 (0)	0 (0)	160 (100)		

NOTE. Data represented as count and percentage of total respondents, N (%).
*Demonstrates only 125 respondents for this question. All other questions had 160 respondents.

One-hundred percent of patients responded that they remembered the preoperative conversation. When asked if they remembered the postoperative conversation, 125 (78.1%) patients responded yes, and 35 (21.9%) responded no (Table 2). However, when asked to rate how well they remembered the postoperative conversation, 75.2% patients rated their memory very poor (48, 38.4%) or poor (46, 36.8%) (Table 3). Of note, only 125 patients responded to this question. All other questions had 160 respondents. Similarly, 129 (80.6%) patients were unable to remember the 3 surgeon-related key words (Table 2).

All patients (160) stated the e-mail, labels on the images, and postoperative instructions were easy to understand (Table 2). When asked how they accessed the e-mail contents, 126 (78.8%) patients used their cell phone, 24 (15%) used a desktop computer, and 10 (6.3%) used a combination of multiple devices (cell phone, desktop, laptop, and/or tablet). One hundred percent of patients either strongly agreed (145, 90.6%) or agreed (15, 9.4%) that the e-mail package enhanced their postoperative experience. Similarly, 100% of patients either strongly agreed (150, 93.8%) or agreed (10, 6.2%) the video enhanced their postoperative experience (Table 3).

When asked what the best part of the e-mail was, 70 (43.8%) responded the entire e-mail package, 53 (33.1%) video, 34 (21.3%) video and the pictures, and 3 (1.9%) pictures alone. No respondent chose the thank you letter or the written postoperative instructions (Table 4). The total average e-mail shares per patient was 2.5, with 158 (98.7%) of patients sharing the e-mail at least once (Table 5). When stratified by age groups 18-29 years, 30-39 years, 40-49 years, 50-59 years, and 60-69 years, averages shares were 3.5, 2.5, 2.1, 1.5, and 1.4 respectively. When asked if patients felt the need to call the office before their first postoperative visit, 142 patients (88.8%) responded no, with 18 (11.2%) responding yes (Table 2).

Finally, 160 (100%) patients responded they would highly recommend this format to their friends undergoing surgery (Table 3).

Discussion

Our study contains several important findings that help further understand the surgical experience for patients undergoing arthroscopic surgery in an outpatient setting. We showed that patients were satisfied with a postoperative e-mail with a video from the surgeon, annotated arthroscopy images, postoperative instructions and a thank you letter. In our study, patients felt the e-mail package improved their overall surgical experience. More than 98% of patients responded that their favorite aspect of the e-mail was the video from the surgeon. This is consistent with a recent study by Kingery et al.,[14] which demonstrated patients preferred and felt better information was provided with a visual phone call versus a standard phone call postoperatively from the surgeon. Although this

Table 4. Responses Regarding What Patients Felt Was the Best Part of the E-Mail Package

	Letter	Instructions	Pictures	Video	Video and Pictures	
What was the best part of the e-mail?	0 (0)	0 (0)	3 (1.9)	53 (33.1)	24 (21.3)	70 (43.8)

NOTE. Data are reported as number and percentage of respondents, N (%).

Table 5. Number of Shares of the E-Mail by Patients, Stratified by Age Group

With How Many People Did You Share Your E-Mail?							
Age Group, y	0	1	2	3	4	5	Average
All patients	2 (1.3)	44 (27.5)	39 (53.4)	40 (25.0)	18 (11.3)	17 (10.6)	2.5
18-29	0 (0)	1 (1.7)	8 (13.3)	23 (38.3)	16 (26.7)	12 (20.0)	3.5
30-39	0 (0)	5 (27.8)	4 (22.2)	6 (33.3)	1 (5.6)	2 (11.1)	2.5
40-49	0 (0)	15 (45.5)	6 (18.2)	8 (24.2)	1 (3.0)	3 (9.1)	2.1
50-59	1 (2.4)	19 (46.3)	19 (46.3)	2 (4.9)	0 (0)	0 (0)	1.5
60-69	1 (12.5)	4 (50.0)	2 (25.0)	1 (12.5)	0 (0)	0 (0)	1.4

NOTE. Data represented as number and percentage of respondents, N (%).

takes a few extra minutes for the surgeon, we see a large impact it could have for the patient and their perception of the surgeon. Practices have widely varying postoperative scheduling of follow-ups, with some using mid-level providers to perform the first postoperative visit. In these instances, the first postoperative surgeon—patient interaction could be at a 4- to 6-week visit. By taking the extra few minutes on the day of surgery to record a personalized video, the surgeon can be the first visual interaction that a patient has, without having to alter their office structure.

We also demonstrated that patient recall of information from the postoperative discussion was extremely low. Only 20% of patients were able to recall the 3 key words and 75.2% of patients rated their ability to remember the postoperative conversation as very poor or poor. Various types of anesthesia have shown differing returns to baseline cognition. Mashour et al.[15] showed that a return to most baseline cognitive functions after general anesthesia was up to 3 hours. This may significantly impact a patient's ability to understand details and findings from surgery discussed in the postoperative holding area. Although all surgical expectations are attempted to be discussed before surgery, there are subtle intricacies to procedures that can drastically change the postoperative instructions. Depending upon the postoperative conversation or adjustments made to postoperative instructions, paper instructions may not provide the level of detail needed for the patient to fully understand their postoperative home care and recovery expectations. This study showed that a multimedia e-mail package can help address these challenges.

In addition, having a multimedia package in their e-mail may reduce the number of times that patients need to contact the office between scheduled visits. In endocrine surgery, Brekke et al.[16] found more than 60% of patients called their surgeon's office in the 30 days after surgery. Pencle et al.[13] created a mobile video conference application for communication with patients perioperatively. They found more than 86% of patients directly contacted either the surgeon or the concierge team before the first postoperative visit. Conversely, in our study, 85% of patients did not feel the need to call the office before their follow-up. By providing the patient with information via multiple modalities (auditory, visual, and print), which is readily available for continued reference, surgeons are potentially able to increase the number of patients with quality understanding of their treatment and instructions.

Finally, the ability to share the information, at the patient's discretion, has multiple potential benefits for the patient and surgeon. For the patient, the information is available as constant resource they can share with others with whom they wish to discuss the surgery. More than 80% of patients used their phone to interact with the information and found it easy to access and of excellent visual quality. Providing the information in an easily mobile form allows them to share the information readily. In sports medicine, this has the potential to provide benefit to athletes, who can readily share information to physical therapists and certified athletic trainers.

The sharing of information also provides a marketing opportunity for the surgeon. Social media use has exploded across orthopaedic surgery, with several studies demonstrating use by more than 30% to 60% of surgeons.[17,18] Our study found the average patient shared their information 2.5 times with more than 98% of patients sharing at least once. Jiang et al.[11] found that more than 60% of their patients shared the recorded postoperative instructions at least once. Santoro et al.[2] found 72% of patients shared their digital media, whereas just 34.5% of patients shared the print media. In addition, when stratified for age group, younger individuals in our study were likely to share their information more frequently. By using the digital media package with a recorded video, the surgeon not only provides a comprehensive postoperative experience, but demonstrates they value a personalized approach to each patient.

Limitations

Our study is not without limitations. First, the sample size is limited with only 160 patients. Thirty additional adolescent patients were excluded due to the potential of bias between patients and parental guardian when viewing the instructions and completing the follow-up survey. Second, the questionnaire was completed by

the patients and ambulatory surgery center study staff rather than with the performing surgeon. Third, the findings are representative of a single surgeon. Finally, the use of a control group may have provided direct comparisons between standard paper and electronic cohorts in terms of patient recall and satisfaction.

Conclusions

This study shows that patients had poor memory of in person conversations on the day of surgery. However, patients were satisfied with a postoperative multimedia package provided via e-mail after surgery. Patients interacted with the e-mail primarily on their cell phones, mostly enjoyed the visual media and regularly shared the e-mail with others, demonstrating multiple opportunities for benefit to the patient and surgeon.

References

1. Graham B, Green A, James M, Katz J, Swiontkowski M. Measuring patient satisfaction in orthopaedic surgery. *J Bone Joint Surg* 2015;97:80-84.
2. Santoro AJ, Ford EA, Pontes M, Busconi BD, McMillan S. Patient-specific e-mailed discharge instructions improve patient satisfaction and patient understanding after surgical arthroscopy. *Arthrosc Sports Med Rehabil* 2022;4:1315-1322.
3. Trinh LN, Fortier MA, Kain ZN. Primer on adult patient satisfaction in perioperative settings. *Perioper Med (Lond)* 2019;8:2-13.
4. Zolnierek KB, Dimatteo MR. Physician communication and patient adherence to treatment: A meta-analysis. *Med Care* 2009;47:826-834.
5. Boulding W, Glickman SW, Manary MP, Schulman KA, Staelin R. Relationship between patient satisfaction with inpatient care and hospital readmission within 30 days. *Am J Manag Care* 2011;17:41-48.
6. Marks M, Herren DB, Vliet Vlieland TP, Simmen BR, Angst F, Goldhahn J. Determinants of patient satisfaction after orthopedic interventions to the hand: A review of the literature. *J Hand Ther* 2011;24:303-312.
7. Mira JJ, Tomás O, Virtudes-Pérez M, Nebot C, Rodríguez-Marín J. Predictors of patient satisfaction in surgery. *Surgery* 2009;145:536-341.
8. da Assunção RE, Neely J, Lochab J, Mizumi-Richards N, Barnett A, Pandit H. Patient recall of surgical information after day case knee arthroscopy. *Knee Surg Sports Traumatol Arthrosc* 2013;21:1510-1515.
9. Atchison KA, Black EE, Leathers R, et al. A qualitative report of patient problems and postoperative instructions. *J Oral Maxillofac Surg* 2005;63:449-456.
10. Horstman MJ, Mills WL, Herman LI, et al. Patient experience with discharge instructions in postdischarge recovery: A qualitative study. *BMJ Open* 2017;7:e014842.
11. Jiang SY, Schultz BJ, Garcia AJ, Gardner MJ, Bishop JA. Patients benefit from recording postoperative instructions after ankle fracture surgery. *Foot Ankle Surg Tech Rep Cases* 2021;1:100048.
12. Kennedy ED, McKenzie M, Schmocker S, et al. Patient engagement study to identify and improve surgical experience. *Br J Surg* 2021;108:435-440.
13. Pencle FJR, Benny A, Quijada KA, Seale JA, Chin KR. Utility of mobile apps for video conferencing to follow patients at home after outpatient surgery. *J Am Acad Orthop Surg Glob Res Rev* 2018;2:e078.
14. Kingery MT, Hoberman A, Baron SL, et al. Day-of-surgery video calls and phone calls increase patient satisfaction with outpatient surgery experience: A randomized controlled trial of postoperative communication modalities. *J Bone Joint Surg Am* 2021;103:243-250.
15. Mashour GA, Palanca BJ, Basner M, Li D, et al. Recovery of consciousness and cognition after general anesthesia in humans. *Elife* 2021;10:e59525.
16. Brekke A, Elfenbein DM, Madkhali T, et al. When patients call their surgeon's office: An opportunity to improve the quality of surgical care and prevent readmissions. *Am J Surg* 2016;211:599-604.
17. McCormick JR, Patel MS, Hodakowski AJ, et al. Social media use by shoulder and elbow surgeons increases the number of ratings on physician review websites. *J Shoulder Elbow Surg* 2021;30:e713-e723.
18. Narain AS, Dhayalan A, Weinberg M, et al. Social media utilization among shoulder and elbow surgeons. *J Am Acad Orthop Surg* 2021;29:123-130.